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ABSTRACT

This paper investigates the intentional creation of ambiguity by composers of cryptic crossword puzzles. Taking a research question of "what makes a cryptic clue more difficult to solve than a simple crossword clue," it compares a sample of cryptic and quick crosswords from "The Guardian" and attempts to isolate the linguistic factors that make the cryptic crosswords more difficult to complete. Cryptic crosswords represent creative employment of linguistic resources within specific conventions to produce a particular form of language as entertainment. It was found that the cryptics, on the whole, do not use more difficult vocabulary than the quicks and that both types of crosswords indicate the senses and denotations of the target words in broadly similar ways. The cryptics do employ more non-prototypical sense of target words and make much use of lexical and syntactic ambiguity in their clue writing to create a "misleading context" that leads the solver "up the garden path." It is argued that cryptic clues provide interesting material to investigate how persons process ambiguity and explore verbal play and humor. Cryptics involve the solver's whole semantic and syntactic competence in the resolution of ambiguity. An appendix offers sample clues with solutions. (Contains 14 references.) (Author/NAV)

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Misleading Contexts: The Construction of Ambiguity in the Cryptic Crossword Clue

John Cleary (DAL)

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MISLEADING CONTEXTS: THE CONSTRUCTION OF AMBIGUITY IN THE CRYPTIC CROSSWORD CLUE

John Cleary (DAL)

Abstract

This paper investigates the intentional creation of ambiguity by composers of cryptic crossword puzzles. Taking a research question of 'what makes a cryptic clue more difficult to solve than a simple crossword clue?', it compares a sample of cryptic and quick crosswords from The Guardian *and attempts to isolate the linguistic factors that make the cryptic crosswords more difficult. The cryptics do not on the whole use more difficult vocabulary than the quicks, and both types of crossword indicate the senses and denotations of the target words in broadly similar ways. The cryptic crosswords employ more non-prototypical senses of target words, and make much use of lexical and syntactic ambiguity in their clue writing to create a 'misleading context' that leads the solver 'up the garden path'. It is argued that cryptic clues provide interesting material to investigate how we process ambiguity, and to explore verbal play and humour.*

'The composer ... does not have to mean what he says, but he must say what he means. He may attempt to mislead by employing a form of words which can be taken in more than one way, and it is your fault if you take it the wrong way, but it is his fault if you can't logically take it the right way.'

'Afrit' [A. F. Ritchie] 1949, (in Manley 1992: 59)

1. The cryptic crossword: genre and system

In this paper I will take a look at the oblique and curious world of the cryptic crossword. Though not widely utilised as a text type for academic research, it is of interest to the linguist as it represents creative employment of linguistic resources within specific conventions to produce a particular form of language as entertainment. Cryptic crosswords constitute a definite genre, with a discourse community whose members both work within, and seek to stretch, particular generic conventions. An analysis of the way this genre is operated by its discourse community can inform study of verbal play and linguistic humour: cryptic clues are primarily exercises in constructed ambiguity and so provide material for investigating how we process ambiguous language. It is an exceedingly widespread arena of language use, as the large popular press of puzzle collections and 'how to' manuals demonstrates. And for the language researcher, too, the cryptic crossword can provide excellent source material for illuminating many aspects of how a language can be operated as a creative system by its users.

I will begin by briefly sketching some aspects of language study that I feel could be informed by examination of crossword puzzles, and in particular cryptic crosswords. A large proportion of research has been psycholinguistic in nature, concentrating on lexical retrieval (Nickerson 1977; Goldblum & Frost 1988) or on analysing the component subskills of expert cryptic crossword processing, in the belief that this can inform us about the nature of strategies utilised by good readers (Underwood et al. 1988; 1994). Of particular interest to such researchers is the interaction between orthographic and phonological knowledge when carrying out lexical searches.

In contrast, study of the crossword as genre has been left largely to the discourse community itself. Many manuals describing the metalinguistic code of the cryptic have been written (the best being Manley 1992, MacNutt & Robbins 1966, and Abbott 1982), but good as they are on aspects of the code relevant to the setter/solver, they fall short of analysing many features of interest to linguists, such as syntactic structure and stylistic variation. One approach could focus upon the coding system as it is employed by different setters. All published cryptics are the creations of individual writers whose

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> ... art is to construct miniature texts delicately poised between (at least) two contexts, sharing finally the resonances of both.
>
> (Noreiko 1983: 238)

A cryptic clue shares with literary discourse the property of being

> ... dependent only on itself for its 'reading'. It generates a world of internal reference and relies only on its own capacity to project.
>
> (Carter & Nash 1990: 38)

Crossword enthusiasts are able to characterise the work of individual compilers - stating, for example, that The Guardian's John Graham, known as 'Araucaria', 'shows great flair' while not being strictly orthodox (Manley 1992: 152). 'Orthodox' is expressed in terms of the ground rules of the genre which were codified by a number of well known crossword setters through the mid-twentieth century, in particular D. S. MacNutt, better known as 'Ximenes'. Both Ximenes and his successor at The Observer, Azed, have acted as a kind of 'supreme court' of the crossword world, laying down judgments about what constitutes acceptable grammar and phraseology within clues. Genre analysts concerned with the issue of the extent to which genre codification is prescriptive may take interest in this fully documented history of a genre's emergence, as well as the setters' debate between orthodox "square dealers" (or 'Ximeneans'), and "legerdemainists" who seek to stretch the generic conventions to their limits in order to inject more creativity into the process (Putnam & Snape 1975: 7-8; cf. Manley 1992: 58ff. on Ximenean orthodoxy). The following classic clue is immensely popular with many setters and solvers, but is disliked by the strictly orthodox (e.g. Manley 1992: 61):

[1] HIJKLMNO (5)[1]

A third approach might investigate the way crosswords exploit the systemic features of language to encode, or merely suggest, or even to hide, meaning. Cryptic clues are exercises in constructed ambiguity, and Noreiko (1983) has used them to illustrate how a given lexical item (in this case in French, although it is equally applicable to English) can be

> ... multi-valued, polysemantic, or homonymous, even of unclear syntactic status, until it can be assigned to an appropriate context.
>
> (Noreiko 1983: 238)

The very nature of the cryptic crossword focuses attention on the interaction of word forms with senses of words. As the ultimate objective is to arrive at a *form*, to be entered in the grid, the setter is quite free to manipulate the senses selected from different readings of the text en route to the solution. Just as in more natural uses of language, ambiguity can be produced in a cryptic clue through choice of lexis, syntax, or, more commonly, a combination of the two. A small amount of research has been carried out into the linguistic structure of crossword clues - mostly in languages other than English (Hellinger 1975, German; Stratmann 1978, English & German; Noreiko 1983, French; Bezerra 1990, Brazilian Portuguese; Vantu 1991, Romanian).

The approach in this paper will be from this direction: an interest in the techniques cryptic crosswords employ to indicate, and to conceal, 'meaning', and in the kinds of knowledge, both of language and of the world, that we employ to comprehend them. Now I will briefly outline the specific objectives of the paper, and the method I have used to investigate them.

1.1 Aims

The commonplace view of crosswords is that simple 'paraphrase' crosswords, such as *The Guardian*'s quick crosswords, are 'easy' while cryptic crosswords are 'hard'. The situation is actually far more complex, with different grades of difficulty holding between different published series of both types of puzzle. However, a leap in degree of accessibility is clearly evident if one tries to move from one of the more challenging quick crosswords, like *The Guardian*'s, to even one of the more straightforward cryptics, such as *The Observer*'s

'Everyman'. To explore the factors that determine difficulty in crossword processing across this particular division presents a useful means to investigate the questions raised in the last paragraph.

One obvious possibility is that the vocabulary employed in 'harder' crosswords is more obscure. This is true of the advanced 'barred' crosswords, like *The Observer Magazine*'s 'Azed', for which a good dictionary is recommended by the setter. But the ordinary 'blocked' cryptics in the daily papers are designed to be solved in situations like trains or cafeterias where dictionaries are not available, and so the target words must predominantly be of everyday frequency. A more likely possibility concerns the senses possessed by the target forms and how prototypically they are associated with the form in question. I would suggest that solvers of 'harder' crosswords need to call upon the following broad classes of knowledge:

- **linguistic competence**: knowledge *of* the relationships between lexemes within the mind, and the connections between lexemes and the outer world; knowledge *of* syntax and phonology.

- **learnt knowledge**: knowledge *about* the orthography, and perhaps the etymology, of written word-forms; knowledge *about* the universe of discourse shared between setter and solvers.

It is difficult to be so clear-cut, particularly in terms of determining precisely where linguistic knowledge ends and knowledge of the world begins. For example, to know the denotation of the word 'Impi' one must also know who the Impi are and where they are from (warriors from southern Africa). Though I have stressed the distinction between knowledge that is acquired and intuitive, and that which is learnt and conscious, this too is probably more of a continuum. The distinction is useful, however, as research suggests that there may be two parallel processes operating in mental word searches: a rapid one working 'below the level of awareness', and a slower search that is 'open to introspection' (Nickerson 1977: 716). Hence, I have classed orthographic knowledge more as 'learnt' because a solver needs to consciously reflect upon his/her knowledge of a spelling system when arriving at a given form, even though reading is an acquired language skill. In this paper it is the former category, knowledge *of* the language, that will concern us - in particular the way the interplay of semantic and syntactic knowledge creates, and conceals, meanings.

Finally, it is important to comment briefly on the crossword-specific linguistic knowledge possessed by expert members of the discourse community. The word 'Impi', given above, will be immediately recognised by all regular cryptic solvers as a conventional 'synonym' for 'warrior'. Indeed, whenever a four-letter form for 'warrior' is required as either an answer or as part of an answer, 'Impi' is almost certain to be it. All novice solvers need to acquire this 'crossword-speak', as well as the body of lexis that acts as indicators of such cryptic categories as anagrams[2], etc. In terms of the above classification this is knowledge both *of* and *about* language in that expert solvers will both automatically recognise the specialist function of such lexemes, and be able to introspectively analyse their role in indicating the parts of clues and targets. Until a solver is conversant with this specialist 'L3' it is an obvious factor of difficulty; to an expert solver, the ability of a setter to manipulate the ambiguity of such items between their specialist and non-specialist senses remains a source of potential difficulty.

1.2 Method

To make useful generalisations about the semantic relations within crosswords it is not sufficient to analyse a single example of each type. Therefore a corpus has been built up containing 169 clues and solutions from six cryptic crosswords selected from successive issues of *The Guardian* in January 1995, representing a week's cross-section of the paper's puzzle. *The Guardian* uses named (or pseudonymous) setters, and the idiosyncrasies of different setters' work may affect the results. However I seek to arrive at the overall design policy of the crossword, as determined by the crossword editor, and which presumably will be reflected in the work of all its contributors. *The Guardian* crossword has been characterised by one general introduction to cryptic solving as 'interesting' but 'sometimes complex', containing 'up-to-the-minute allusions' and featuring 'extensive cross-references between clues' (Kindred & Knight 1993: 21). A sample covering a number of setters should capture more of what is generalisable about their work.

In the next section of the paper I will begin by looking at ways in which crosswords exploit semantic knowledge to encode, allude to, or hide meaning. Some comparison is necessary with quick crosswords in order to meet the explanatory aim of drawing conclusions about the particular techniques cryptic crosswords employ. To this end I have collected a secondary corpus which contains the quick crosswords published in *The Guardian* on the same days as the six cryptics. (There are only five of these as there was no quick crossword on the Saturday in question.) Full details of all the crosswords selected can be found in the References, as well as the method used to cite example clues in the following text.

Section 3 will give an account of a small-scale experiment carried out to investigate how different the semantic components of cryptic and quick crossword clues really are. In the last section I will show from this that what distinguishes the two forms of crossword, and accounts for a large degree of difficulty in the cryptic type, is the interplay that exists between the lexical and syntactic systems in creating and resolving ambiguity.

2. Meaning and the crossword clue

2.1 Sense and denotation in the quick crossword

Quick crosswords mainly operate by suggesting the sense relations that hold between clue and target: in a clue 'Difficult' with the target 'Hard', for example, this is the relation of synonymy between the two lexemes. At the level of quick crosswords it is not necessary to be concerned about the partial nature of the synonymy: any *form* that can possibly be cognitively synonymous with the clue will be a member of the set of possible targets. Thus, because HARD and DIFFICULT are 'incapable of yielding sentences with different truth-conditions' (Cruse 1986: 88) when inserted into a sentence frame like the following:

Brain surgery is a _____ skill to master

no attention need be paid to the range of senses in which the two lexemes are not compatible, e.g.

Kim is a { difficult / *hard } child
This a { hard / *difficult } pillow

It is the synonymy of *lexical units*, that is the identifiably discrete senses of polysemous lexemes (Katamba 1994: 143), rather than the lexemes themselves that forms the basis of equivalence between crossword clues and targets. A relationship of synonymy can also hold between an *expression* like:

[2] Absolute tyrannical ruler (8) [G7721Q]

and its target 'dictator'. It could be argued that crosswords work entirely by means of exploiting sense relations, with the exception of the occasional 'quiz' type clue in quick crosswords, such as:

[3] City delivered by Jeanne d'Arc (7) [G7722Q]

for which 'Orléans' is the target of a referring expression. Such clues are not common in *Guardian* quicks, and even rarer in cryptics.

However, just as it is incorrect to take sense as being a more basic type of meaning than denotation in general terms (Lyons 1977: 211), it cannot be assumed that crossword solving operates without reference to the denotation of a lexeme. One way to create a frame to test the synonymy of [2] would be by the construction of a referring expression which describes one of the denotata of the two terms:

The _____ of Germany was Adolf Hitler

[2] passes the synonymy test with this frame. Again, the fact that this descriptive synonymy may be partial (depending upon whether one believes that 'dictator' necessarily entails 'tyranny') does not undermine the validity of this particular clue-target relationship. Many clues are similarly synonymous with their answers

simply because they are descriptive of a common denotatum, and this is particularly so when the clue is an analytic or synthetic paraphrase. Such clues operate like dictionary definitions - hence the use of the term 'definition' by writers on crosswords - though there are important differences, to which we shall now turn.

Reasons of space, and the need to avoid making a clue too obvious, dictate that a crossword clue must always be less complete than a dictionary definition. However, crossword 'definitions' frequently include clues of this style:

[4] Punctuation mark (5) [G7723Q]

which clues 'colon' - but why not 'comma', or 'point', not to mention all the other possible answers disallowed only by the specified number of letters? The clue is superordinate to the answer, and indeed crossword compilers make frequent use of hierarchical sense relations, almost always in the form of the clue being superordinate to the target. This is justifiable given that a crossword is not a dictionary, but a word game: the solver is asked to carry out a search through a certain class of lexemes. Though hyponymy is the most common form of lexical superordination in crosswords, there are also to be found relations of meronymy (part-whole) and troponymy (manner of doing), and taxonomy, illustrated by the following:

[5] Army unit (8) [G7720Q] - 'division'
[6] Weep noisily (3) [G7721Q] - 'sob'
[7] Species of crow (5) [G7721Q] - 'raven'

Setters tend to be rather vague when it comes to describing sense relations: for example, the former *Daily Telegraph* crossword editor May Abbott, in an otherwise entertaining and informative book, blithely describes 'tern' as a synonym of 'bird' (1982: 34). Accuracy of terminology may not matter greatly to the setter; but it seems more important that they should be aware of the distinction between the equivalence of two forms (synonymy) and the superordinate relationship exemplified by 'bird'→ 'tern', as this could be a major variable determining the difficulty of a given word search.

Quick crossword clues, therefore, are not really 'definitions', but will be better described as meaning indications (MI). They are most likely to trigger the solution through networks of sense relations, but denotative equivalence or inclusion may also play a part. We will move on now to the cryptic, and ask if it indicates meaning in comparable ways.

2.2 Meaning indications in the cryptic crossword

Almost all cryptic clues possess a part that crossword professionals label the 'definition', but which I will term the MI (meaning indication) for the reasons specified above. In a large number of clues the MI is supplemented by a part known within the crossword discourse community as the 'subsidiary indication' (Manley 1992: 30). To label its function more explicitly I will term this the form indication (FI), as its purpose is to indicate the particular word *form* required through a metalinguistic code peculiar to the crossword puzzle. The FI gives cryptics one advantage over quicks in that the two parts of the clue can be cross-checked to confirm immediately whether a suggested answer is right or wrong. Of course, this also means that it becomes possible to clue MIs somewhat more 'loosely' than in the MI-only quick crossword. Typical cryptic clues come in one of three basic structures:

- **MI + FI**: the two parts can come in either order.

These clues are intended to be read in two ways: the misleading 'natural' way, and as a metalinguistic encoding of the sense and form of the target. Hence, there are two corresponding ways of analysing the syntax of the clue. [8] is an acceptable English sentence:

[8] Recalcitrant lads can cause malicious talk (7) [G20245]

Malicious talk appears to fit seamlessly in to the sentence as the object complement of *cause*. Its constituent structure can be analysed as in Figure 1.

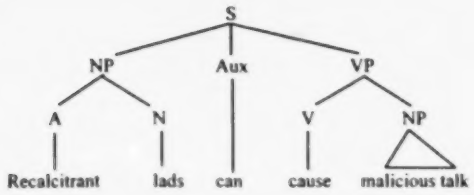
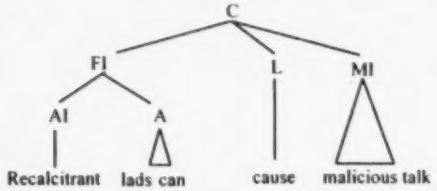


Figure 1: constituent structure analysis of clue [8]

But this FI is an example of the prototypical cryptic clue, the anagram; to equate it with its solution, 'scandal', it becomes necessary to make a division around *cause*. In clue-syntax *malicious talk* is an equal constituent to *Recalcitrant lads* can, the two coordinated by the link word *cause*. Figure 2 uses a tree diagram to show how it should be parsed in order to be read as a cryptic clue.



Key: C = clue; FI = form indication; L = link; MI = meaning indication; A = anagram; AI = anagram indicator, i.e. word used to indicate position of anagram within the clue

Figure 2: [8] parsed as crossword clue

The majority of clues - 80% in the *Guardian* sample - possess variations on this type of structure, (though only about 25% of them can also be analysed as well formed English sentences - noun phrases being more common at around 39%, with 9% non-finite clauses, and a further 11% ambiguous; the issue is obscured by the degree of newspaper-style ellipsis of articles and so forth). One component of the clue obliquely describes the *form* of the target, while the other describes one of the target's *senses*.

- **MI + MI**: each part relates to different senses of a polysemous target, with a third misleading sense produced by their juxtaposition:

  [9] Flexible section of a gun-carriage (6) [G20245]

clues 'limber', the solver having to find the correct place in the clue to make the division, without being misled to think that the target is 'a part of a gun-carriage that is flexible'. More on this clue later. The 'double definition' constitutes 13% of the sample.

- **MI only**: in contrast to the descriptive definitions of the quick crosswords there is the 'cryptic definition', an indirect allusion to the target's meaning, often involving puns and wordplay:

  [10] One lacking a blooming partner? (10) [G20248]

This clues 'wallflower', and but for the inclusion of the pun *blooming* would actually be a fair description of the extension of one particular sense of the target. This type of clue plays an important role in cryptics as it maintains the possibility that not every clue can automatically be analysed into a MI + FI or MI + MI structure, and so increases the range of ambiguities available for those words commonly employed as crossword metalanguage. The word *lacking* in [10], for example, is often encountered as a subtraction

indicator, instructing the solver to delete a letter or letters from other words in the FI. The existence of this type of clue, permitting indicators to denote their full lexical value, rather than play a functional role, is certainly a factor that adds a degree of difficulty, and, indeed, interest to cryptic solving. About 7% of the clues in the sample were of this type.[3] Indeed, as I suggested above, the existence of the two corroborating sections of the cryptic clue permits MIs in all types of clue to be written more indirectly, providing the crossword setter with a further tool for controlling the level of difficulty.

3. Meaning indications: an experiment

3.1 Ne'er shall the twain meet?

The MI in [8], *malicious talk*, looks as if it could appear in a quick crossword. In general, there appears to be a fair degree of overlap in the styles of MIs in the two forms of puzzles, and there was an intriguing illustration of this in one of the quick crosswords in the sample:

> [11] Flexible - part of a gun-carriage (6) [G7720Q]

This was published only the day before [9] which it effectively disambiguates. The answer, 'limber', might be thought a rather difficult target for a quick crossword, as with the sense of 'flexible', *adj.*, it is of quite low frequency (in contrast to the more common verbal usage 'to limber up'). As a meronym of 'gun-carriage' its denotation is technical, and also of low frequency. This is an interesting example of how degrees of difficulty holding between the different types of crossword need not necessarily be a result of the frequency of the words, or the typicality of the senses, used. It is hard to know whether this was an unfortunate slip on the part of the crossword editor, or whether such coincidences are an inevitable consequence of the huge number of puzzles being generated by the various dailies - or indeed if it was simply a case of two different compilers independently arriving at the same conclusion. Nevertheless, it was fortunate to uncover in a small sample such a clear example of how quicks and cryptics overlap in their approach to indicating meaning.

I decided to carry out a mini-experiment by converting a *Guardian* cryptic into a *Guardian*-type quick crossword by isolating the MIs, and then seeing if it could be distinguished from a genuine quick crossword. The allusive nature of the MI-only clue type renders it unsuitable for a quick, so it was necessary to select a crossword from the sample that did not employ this type of clue. Three of them fitted this requirement, and G20246 was the best of them as it also contained a selection of the MI+MI clue, which is common to both types of crossword along the lines of [9] and [11].

This form of clue can be viewed as a bridge through which quick crossword enthusiasts can begin to acquire the subskills of cryptic solving. The *Guardian* quick is noted for a large proportion of double MIs, in contrast to its rival dailies which employ almost exclusively single synonyms or short paraphrases. It was therefore desirable to include a representative proportion of double MIs in the mini-experiment. The selected puzzle, G20246, used them in six out of its 28 clues: at 21% a little higher than the average of 12% for the quicks in the sample, but not untypical of the occasional *Guardian* quick (e.g. G7719Q in the sample which had four double definitions in its 20 clues: 20%). In the modified puzzle, which can be seen in Figure 3, four of the doubles were disambiguated with a dash (9a, 10a, 2d, 7d), while two others in which the two MIs were separated by link words in the original (12a, 25a) were transferred to the modified puzzle without change.

Across

8	A brave leader (8)
9	Horse replacing another - campanologist (6)
10	Bill - the magistrate (4)
11	Traders having fits (10)
12	Lots of chimneys (6)
14	Nobleman abroad (8)
15	Student in first year (7)
17	Go down (7)
20	An idler (8)
22	Capital (6)
23	Orderly (10)
24	Stoves (4)
25	A piece of furniture for the office (6)
26	Choice (8)

Down

1	Father (8)
2	Some footwear - a hit (4)
3	Field event (6)
4	Eat (7)
5	Fussy decoration (4-4)
6	Direct opposite (10)
7	Footballers - red cards (6)
13	Injured people (10)
16	Huge (8)
18	Harmony (8)
19	Speech defect (7)
21	Refuge (6)
22	In clue (anag) - round which things may grow (6)
24	Wine (4)

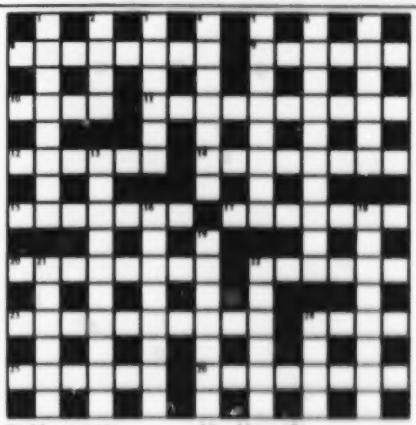


Figure 3: Guardian crossword no. 20,446 (adapted version)

If any readers feel like attempting the experiment, I would be very interested to receive any comments (care of DAL). See how many answers you can enter in Figure 3 in 15 minutes, before reading any further. Then check the answers in the Appendix, which also contains a full analysis of the relation of the clues to the targets in the original. The MI for each clue is printed in bold face, and this should be sufficient to show how the quick-type clues for the modified puzzle were derived. Other than the clues dealt with above, the general principle was to transfer each MI unchanged, to test whether the solvers would accept it as a valid clue. The only problem lay with the unusual anagram clue 22d:

[12] Anagram in clue round which things may grow (6) [G20246]

This rather odd clueing of an anagram, employing Anagram as the indicator, permitted an easy transformation into a typical Guardian quick-type anagram clue, which is often marked by the abbreviation 'anag' and followed by a MI separated from the anagram by a dash, thus:

[13] In clue (anag) - round which things may grow (6)

The only other slight difficulties concerned whether to allow the rather cryptic MIs in 8a and 11a to be entered unchanged. However The Guardian occasionally employs punning clues in its quick crosswords, such as:

[14] Frightened to death? (6,5) [G7719Q]

which as a clue for 'scared stiff' would not be out of place in a cryptic crossword. Therefore the two MIs were judged acceptable. Finally, it must be noted that the 15x15 diagram was preserved, in contrast to the 13x13 diagram normal in a Guardian quick.

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3.2 Procedure and results

The aims of the experiment, which was on a very small scale and intended to be hypothesis-forming, were as follows:

- to see how far the clues could be solved as quick-type clues, without necessity of support from the FIs;
- to see what, if anything, the participants noticed about the puzzle, and whether it confounded their expectations of a quick-type crossword in any way.

The puzzle was given to five native speakers of English, all post-graduate students at Edinburgh University, four of them students of Applied Linguistics. All of them were at least occasional solvers of quick crosswords, and one (C) was an occasional cryptic solver. The puzzle was given unmarked, as shown in Appendix 2, and the participants were told that it was a "definition type" crossword "drawn from" The Guardian. Two of the participants worked together, giving four data sheets. All but one of the five made rapid progress through the clues, and after approximately 15 minutes the number of clues solved correctly for each participant was counted.

Subject	A&B	C	D	E
Number of clues solved (out of 28)	9	12	18	5

Table 1: Number of clues solved by each participant after 15 minutes

The post-hoc comments of the participants were of as much interest as the above figures. All but one were surprised that the puzzle was a modified cryptic, and commented that they would not have been able to solve as many clues as quickly if they had been confronted with the undoctored original. On the other hand, all of them sensed something odd about the crossword, and commented during the exercise that it looked e.g."a little cryptic". Clearly the fact that it was not directly photocopied from the newspaper probably alerted them to its likely unusualness; subject E was distracted by the idea that it was ambiguously cryptic/non-cryptic, and this distracted him from entering answers he thought too obvious.

Also interesting is an analysis of the responses to the individual clues (total number = 28):

Correct by all four subjects	4	20a, 25a, 4d, 16d
Correct by three out of four subjects	4	10a, 12a, 15a, 13d
Correct by two out of four subjects	4	8a, 26a, 2d, 19d
Correct by only one subject	7	9a, 14a, 23a, 2d, 3d, 22d, 24d
No correct answers	9	5d, 6d, 18d (all cross with 17a) 11a, 22a, 24a, 7d, 21d
All four incorrect		17a: 'descend' *for* 'subside'
Two out of four incorrect		19d: 'stammer' *for* 'stutter'
Total number of clues with at least one correct response	19	

Table 2: Analysis of subjects' response to derived clues

Clearly, the large number of clues solved were primarily due to the performance of D, but as she was not a previous cryptic-solver this is in itself interesting. The majority of the clues solved lay in the left-hand sector of the puzzle, so a longer time limit may have allowed more opportunity for all participants to enter more answers on the right side. 17a, 19d and 22a are probably unsatisfactory for a quick, though setters often use crossing letters as an aid to such unclear clues. Everyone had problems with the cryptic 11a, though two of the four got 'Geronimo' for 8a, which is a little less cryptic. Interestingly, there was an almost complete

solution rate for the two unchanged double-MI clues, though the four double-MIs disambiguated with a dash had a much lower solution rate.

- No claims for statistical significance could possibly be made with such a small sample, but the fact that at least one correct answer was entered for 19 of the 28 clues, in a relatively short period, suggests it may be worth while to re-run this experiment under more tightly controlled conditions. It lends some weight to the argument that there is a considerable overlap between the techniques employed to indicate the senses and denotations of the targets of both kinds of crossword. Consequently, a major factor affecting crossword difficulty is the degree of opacity of the structure of a cryptic clue, and, correspondingly, the ability to distinguish the MI from the other parts of the clue is a subskill crucial to cryptic solving. This accords with the view of Underwood *et al.* (1994: 547) that this subskill should be investigated in order to build up a model of the expert cryptic solver.

A word search can be expected to be more difficult if it is based on a superordinate term rather than a synonym or paraphrase. Indeed, a survey of the experimental crossword suggests that it makes more use of superordinates in the MI than do the quick crosswords in the sample: approximately 35%, as compared with just over 10% of the quick clues (see Appendix - though it is not always clear-cut whether one expression is superordinate or equivalent to another, so this contains a only heuristic breakdown based upon my own intuitions, which would need to be tested more thoroughly). But the main hypothesis that I wish to derive from the experiment is that MIs in cryptic and quick crosswords are broadly similar (given the higher incidence of less specific superordinates in cryptics), and that it is the additional material in a cryptic clue that contributes the greatest element of difficulty. Most of the MIs in cryptic clues are not in themselves crypti , hence the ease with which the solvers were able to solve them, but it is the addition of the FI, or the second MI, that adds the crucial cryptic ingredient. In the final section I will examine the working of this apparent paradox.

4. The creation of ambiguity in the cryptic clue

The experiment shows that cryptic clues are frequently structured around an explicit sense relation that holds between MI and target word. The crossword setter's art lies in finding a way of seamlessly blending MI with FI, or secondary MI, so that the solver finds it difficult to identify the transition, or is led to think about a field of meaning totally unrelated to the target. In [8], above, although the semantic field of the target is related to the sense of the clue, by parsing it as a well-formed sentence the solver would miss reading *lads can*, which is not a syntactic constituent, as an anagram. [9] is slightly more misleading as the solver may begin the word search for a part of a gun-carriage 'that is flexible'. Manley talks about aiming to construct the 'misleading context' (1992: 25), and Abbott writes that when she is 'in the compiler's shoes, we would enjoy leading our solver up the garden a little...' (1982: 21). This is the chief role of the form indication in the cryptic clue, exploiting the polysemy of lexemes, and the homonymy of word forms.

4.1 Polysemy and the form indication

The word *scrub* is well described by Noreiko's comments (on page 2): it can operate as a verb or noun, and as either it possesses multiple discrete senses. The following clue clearly selects one particular sense:

[15] Scrub the cooker top and clean out (6) [G20248]

The FI (a complex anagram of *clean* plus the "top" of cooker, i.e. *c*) can ultimately be used to double-check the answer. However, its primary role is to guide the solver away from the target, which is a synonym of another sense of the verb *scrub*: 'cancel'. Similarly, the collocation of *perception* and *smartness* in [16] suggests the sense of 'being clever' for *smartness* (which is also something for which poultry are not renowned):

[16] Poultry have no perception of smartness (4) [G20247]

This is a subtractive clue: a synonym of *perception*, 'ken', must be taken from a hyponym of *poultry*, 'chicken', to leave a synonym of another sense of *smartness*: 'chic'.

The misleading sense of *scrub* in [15] is more prototypical than its target sense, (though the same probably could not be said of the relationship between the two senses of *perception*.) Abbott (1982: 14) comments that the setter looks for unusual meanings of polysemous words, suggesting as an example how *butter* (noun) could have the sense of 'flattery', or even of 'goat' (i.e. 'an animal that butts')! The latter idea is a punning use of derivational morphology common in crosswords, which allows the setter to create a number of highly unprototypical pseudo-synonyms: 'adder' and 'summer' can both become synonymous with 'calculator' (Abbott 1982: 14). This is a good example of how semantic and other linguistic knowledge can intersect to create verbal humour. However, the evoking of a prototypical sense where a non-prototypical one is the key to the puzzle is a widespread crossword technique.

This raises interesting questions about the way we mentally process language. If *scrub*, 'clean with a scrubbing motion', is more prototypical than *scrub* 'cancel', does this mean it is more likely to be selected by the solver as s/he begins to read "Scrub ..."? Or is it the case, as implied by some psycholinguistic evidence, that we would activate all senses of *scrub*, those inappropriate to the context that follows being suppressed as it is processed? Intuitively it may seem that the prototypical sense is more likely to be prominent, but tests on the responses of people to lexical ambiguities such as:

"After taking the *right* turn ..." (i.e.. 'right-hand' or 'correct')

imply that processing is delayed, even when the subjects 'claimed not to have noticed the ambiguity' - and that this happens 'even when the context strongly biases them in one direction' (Aitchison 1994: 214-6). According to this model of language comprehension, all the polysemous senses of *smartness* should also be, however briefly, activated by the solver, as, indeed, should those of *perception*. But it has also been argued that the strongest links within the mental lexicon are those between co-ordinates within a semantic field, or words that commonly collocate; and that these are stronger than other structural relations within the vocabulary, such as hyponymy and synonymy (Aitchison 1994: 87, 97). Thus an interpretation of *smartness* and *perception* as co-ordinates within the semantic field of 'mental acuity' may be dominant over the 'smartness' ↔ 'chic' relation found in a different semantic field, and this could be the mechanism through which the misleading context operates to suppress the correct answer in the solver's mind. Cryptic clues offer an interesting means to investigate the effect of context on the resolution of lexical ambiguity.

4.2 Lexico-syntactic ambiguity and homonymy

The ambiguity of cryptic clues is actually far more complex than simply a matter of choice between polysemous senses of a lexeme. With [16] the solver is not too distracted from considering a number of synonyms of *smartness* in different semantic fields. But relatively few of the clues in the sample depend entirely upon the polysemy of individual items. Far more, in fact, depend on contrasting syntactic readings of the clue. The following clue can be read two ways:

[17] Signal to bring in a social worker (9) [G20245]

Is this a slightly abbreviated noun phrase, i.e. "A signal to ..."? Not if the clue is to be solved, for which it needs to be expanded to something like "It is signal to ...", giving 'important'.[4] It is not only necessary to find another sense for *signal*, but its word class must be changed too. The reading of the whole clue modulates with the lexeme choice: if *signal* is a noun, the infinitival complement is read as the purpose of the signal; if an adjective, the complement is semantically equivalent to the content clause in the paraphrase "It is important *that we bring in a social worker*". This is a case of lexico-syntactic ambiguity, as the MI is not only given multiple potential senses by the FI, but the two parts together create syntactical ambiguity that could lead equally well to the selection of distinct senses. The elliptical 'headline' style of the majority of clues plays an important role in creating this ambiguity. Another example is:

[18] Orderly sorting out messy attic (10) [G20246][5]

"An orderly who is sorting" (noun + elliptical relative clause) or "Sorting in an orderly manner" (adverb of manner + verb phrase)? Both are possible, but only the second leads to the answer 'systematic'. The MI

orderly, whatever semantic similarity may underlie the diachronic origins of its two readings, can no longer be termed a polysemous lexeme, but must be seen as two different morpho-syntactic words that are partial homonyms (Lyons 1977: 560-5). I would suggest that the increased semantic and syntactic distance of the two readings of *orderly* and *signal* has led to a further gradation of difficulty when compared to [15] and [16].

There seems to be a still further increase in difficulty with the next clue (which is also a nice illustration of the 'up-to-the-minute allusions' of the *Guardian* crossword)[6]:

[19] Certain quarters claim Peter Preston should be tried (7) [G20247]

There is no longer any question of syntactic ambiguity here: the syntactic form of *be tried* fixes it as denoting 'given a trial' (most probably in court). Only by isolating it from the context can it be matched with a synonym that also satisfies the metalinguistic encoding of the FI. It is also necessary to change its sense, to that of 'attempted': 'essayed'. This raises many questions about the maximisation of polysemy (Lyons 1977: 566-7), and whether all senses of the verb *try* should be seen as polysemous variants, or whether the differing senses are also different enough in their syntactic behaviour to warrant classification as partial homonyms. *Try* in the sense of 'court action' is more likely to be used in the passive, with a human patient, and shows a particular complementation pattern, viz. "He will be *tried for murder*". On the other hand, it could be seen as being part of a sense spectrum (Cruse 1986: 72) linked to *try* ↔ *attempt* by means of *try* ↔ *test*, e.g. "He will be tried in the post for a month".

As with the different degrees of synonymy, I do not think drawing a comprehensive theoretical distinction between polysemy and homonymy really matters to crossword setters and solvers. However, it could be useful in analysing the factors that make for crossword difficulty: the further the distance in sense and syntactic role between two readings of the form in the MI, the more difficult it will be for the solver to identify the target. One of the most pithy illustrations I have found of this came in a *Daily Telegraph* crossword:

[20] Have on last (4) [T21440]

While not an especially difficult double MI clue for 'wear' because *have on* leads fairly directly to the answer, I feel the use of *last* in its adverbial sense makes it quite hard to process as a route to a verbal target. It could really lead the solver up the garden path if the comparatively simple *have on* were replaced by something less direct, such as "Battle consumed the English last". Finally, I will end with a particularly skilful, and tricky, clue of this kind, taken from *The Independent*, in which three different senses are summoned from one form producing an excellent example of the misleading context:

[21] Bears causing real upset among bears (9) [I2559]

We have to banish all schemata of wild animals frolicking in the woods from our minds, and instead take one homonym of *bears* 'totes' and insert an anagram of *real* into (*among*) it to reveal a third: 'tolerates'. The use of *bears* as nouns apparent in the 'natural' reading of the sentence lead us far up the garden path away from the target, which is recoverable only through the 'deviant' reading of treating the word-forms in the clue as objects to be broken down and re-arranged.

5. Conclusion

Cryptic crosswords are a form of verbal play that make full use of the linguistic resources of the solver: primarily an exercise in relating senses of lexemes to forms of words, they involve the solver's whole semantic and syntactic competence in the resolution of ambiguity. I set out to attempt to identify the factors that transform the 'easier' activity of quick crossword solving into the more specialised one of cryptic solving, and such factors include:

- vocabulary of low frequency (though not so much at the 'daily' cryptic level)

- less specific clueing e.g. a higher ratio of superordinates to synonyms
- more cryptic meaning indications
- difficulty in distinguishing the meaning and form indications within the clue
- ambiguity in the role of indicator terms, e.g. *lacking* for subtraction, or *upset* for anagrams
- lexically ambiguous meaning indications with misleading senses suggested by context
- syntactically ambiguous clues
- non-ambiguous clues forcing a semantic and syntactic reading on to MI that is distant from target

It is likely that these factors are graded, so that the last quite possibly has the largest effect on crossword difficulty. While most research on crossword solving skill has focused on skills of manipulating individual words, there is a recognition that the subskills of processing entire cryptic clues need to be investigated - in particular relating to the fourth factor above (Underwood *et al.* 1994: 547). How solvers process the lexical sets used as indicators of anagrams and other clue types is also of interest, as this is another area, too broad to look at in this paper, calling for creative reading by the solver.

I would like to finish by suggesting again that the cryptic crossword offers much scope for exploration of the creative and productive use of language, in non-literary situations. I'll give the last word to Ximenes, the deviser of most of the ground rules for cryptic clue writing, and so one of the major founders of the cryptic crossword as genre:

> ...one can never fully forecast what new train of thought the sight or sound of a given word or phrase will set in motion. Nor can one anticipate the extent to which the English language can be manipulated with ingenuity and freshness.
>
> (MacNutt & Robbins 1966: 103)

Notes

[1] The answer is 'water', and is of course a pun on "H to O". The orthodox would object to its lack of any indication of the meaning of 'water', or of any metalinguistic indicator of the type of pun. The unorthodox, on the other hand, simply appreciate its ingenuity.

[2] Such as the fact that 'disorder' or 'wild' indicate a likely anagram, or 'skipping' a subtraction of some letters from another word (all examples drawn from the *Guardian* sample). This is far more than simply recognising a memorised list, and is in fact a productive process. Expert solvers are able to recognise particular semantic fields as crossword metalanguage—but this would form the basis for another paper.

[3] Although the *Independent* appears to make more use of them: in one example, 11 out of 30 clues were cryptic definitions (12,557); this possibly contributes to the reputation of the *Independent* crossword as being both more difficult and wittier than its rivals (cf. comments of Kindred & Knight 1993: 21).

[4] The FI is a charade: import + ant; 'ant' being a crossword-speak synonym for '(social) worker'

[5] Anagram of *messy attic*. Despite the comments in this paragraph, this is a much easier clue than [17] for an expert solver due to the saliency of *sorting out* as an anagram indicator (my thanks to Kate Lawrence for pointing this out). Nevertheless, an inexperienced solver making the transition from simple crosswords, and still lacking competence in the genre-specific language, would, I feel, find the misleading contexts of [17] and [18] similar obstacles to solving the clue.

[6] Or at least it was in January 1995, when the then *Guardian* editor Preston was still in the bad books of the political establishment. The clue is a charade, with much use of crossword jargon: E + S (i.e. quarters = compass points) + say + Ed (= editor).

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1. Primary sources

i *The Guardian* crossword sample

Publication date	Crossword	Setter	Quick crossword
Saturday, 21 January 1995	20,244	Enigmatist	—
Monday, 23 January 1995	20,245	Crispa	7,719
Tuesday, 24 January 1995	20,246	Orlando	7,720
Wednesday, 25 January 1995	20,247	Gordius	7,721
Thursday, 26 January 1995	20,248	Rufus	7,722
Friday, 27 January 1995	20,249	Shed	7,723

Guardian crosswords are coded in the text as follows: G + number, e.g. G20244 = 21.1.95
Quick crosswords are coded as follows: G + number + Q, e.g. G7719Q = 23.1.95
The setters' pseudonyms refer to the cryptic crossword; *Guardian* quick crosswords are anonymous.

ii Other crosswords referred to in text

Publication date	Source	Crossword	Setter
Friday, 23 December 1994	*Daily Telegraph*	21,440 (T21440)	—
Thursday, 29 December 1994	*The Independent*	2,557 (I2557)	Spurius
Saturday, 31 December 1994	*The Independent*	2,559 (I2559)	Lucifer

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Appendix: Guardian Crossword No. 20,246 (Cryptic clues, solutions & analysis)

#	*Clue (MI in bold)*	*Answer*	*Analysis of FI*	*FI type*	*MI sense rel to target*
a08	**A brave leader gives region new way of working**	Geronimo	region + MO? *anag*	comp anag	super
a09	**Horse replacing another | campanologist**	ringer	—	double MI	syn | syn
a10	**Bill | the magistrate**	beak	—	double MI	syn | syn
a11	**Traders having fits**, finding customer is always wrong?	costumiers	customer is *anag*	anag	cryptic allusion
a12	**Lots of chimneys**	stacks	—	double MI	syn | syn? super (mer)?
a14	**Parades before eastern nobleman abroad**	marchese	marches + E	char	super
a15	**Villein comes back with female student in first year**	fresher	serf *rev* + her	comp: rev-char	syn
a17	**Go down with U-boat team**	subside	sub + side	char	syn
a20	**Song concerning an idler**	layabout	lay about	char	syn
a22	**Capital letters in SAUNAS**	Nassau	SAUNAS *anag*	anag	super
a23	**Orderly sorting out messy attic**	systematic	messy attic *anag*	anag	syn
a24	**A fuel for stoves**	Agas	a gas	char	super
a25	**A piece of furniture for the office**	bureau	—	double MI	super | syn
a26	**Choice of English reading**	election	E + lection	char	syn
d01	**Father improved, for example, inside**	begetter	e.g. *in* better	c-c	syn
d02	**Some footwear that's a hit**	sock	—	double MI	super | syn
d03	**Talk about endless field event**	discus	discuss - s	subtr	super
d04	**Study birds about to eat**	consume	con + emus *rev*	comp: char-rev	syn? super (tropon)?
d05	**Fussy decoration turned out for university doubles**	froufrou	(for *rev* + U) x 2	misc: double-rev	syn? super?
d06	**One tax is the direct opposite**	antithesis	an tithe is	char	syn
d07	**Footballers getting red cards**	hearts	—	double MI	super | super
d13	**Informal wear injured people**	casualties	casual ties	char	syn
d16	**Wren or mouse, most huge**	enormous	Wr-en or mous-e	hid	syn

d18	**Harmony** in sad piano composition	diapason	sad piano *anag*	anag	super
d19	Good person, say, with a **speech defect**	stutter	St. + utter	char	super
d21	In a run-down **area** youth-leader found **refuge**	asylum	y *in* a slum	comp: c-c-char	syn
d22	**Anagram** in clue **round which things may grow**	nuclei	in clue *anag*	anag	syn
d24	**Wine** when it turns	Asti	as + it *rev*	comp: char-rev	super

Abbreviations & Taxonomy of FI types (from Manley 1992)

1.	anag	anagram
2.	char	charade: assemble words or abbreviations in string to form target
3.	rev	reversal: reverse part of FI to produce target
4.	c-c	container & contents: insert a word or abbreviation into another to form target
5.	subtr	subtractive: take indicated letters away from a word to form target
6.	hid	hidden word: target is concealed within words in the FI
7.	sound	puns & homophones: no example above, but e.g.: "Snare is why 'Arry can't irrigate 'is garden" [G20245] for 'noose', i.e. "no 'ose"
8.	comp	complex: combinations of two or more of the above
9.	misc	miscellaneous